REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed February 12, 2004. Upon entry of the amendments in this response, claims 1-8, 10-17 and 19-31 remain pending. In particular, Applicants have amended claims 3, 7, 10, 11, 14, 16, 17, 25, 27 and 28, claims 9 and 18 have been canceled without prejudice, waiver or disclaimer, and claim 31 has been newly added. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

A. Allowable subject matter

Applicants wish to place on record their appreciation of the Examiner for allowing claims 1, 2, 7, 8, 13, and 21-24.

B. Objections to claims

a) Statement of the objections

Claims 7-12, 16-18, and 25-30, which include some allowable claims, have been objected to because of the following informalities: The phrase "the cyclic prefix" is suggested to be changed to "a cyclic prefix."

b) Response to the objections

First-time occurrences of the phrase "the cyclic prefix" in claims 7-12, 16-18, and 25-30, have been amended appropriately. Applicants request withdrawal of the objection, and further request allowance of claims 7-12, 16-18, and 25-30.

C. Rejection of claims under 35 U.S.C. §112

Claims 3-6

a) Statement of the rejection

Claims 3-6 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specifically, with reference to independent claim 3, the Office Action states "claim 3 recites the limitation "detecting a phase error between a received pilot tone and a local oscillator signal; applying the phase error to the input of a phase locked-loop to generate a frequency correction signal;..." and goes on to explain that "the phase error is detected in the PLL and not applied to the input of the PLL."

b) Response to the rejection

Currently amended claim 3 includes in pertinent part, "applying the phase error signal from the PLL to the ADC to modify the sampling time of the ADC." Attention is drawn to FIGs. 6 & 7 and corresponding description, especially on page 21, lines 13-15, that describe this part of claim 3 in such a way as to enable one of ordinary skill in the art to make and/or use it. Applicants respectfully assert that claim 3 is now in condition for allowance.

Because independent claim 3 is allowable, claims 4-6 that depend directly on claim 3, are also allowable as a matter of law. *In re Fine*, 837 F. 2d 1071 (Fed. Cir. 1988).

Consequently, Applicants respectfully request withdrawal of the rejection of claims 3-6, followed by allowance of these claims.

Claims 11, 12, and 28

a) Statement of the rejection

Claims 11, 12, and 28 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specifically, with reference to independent claim 11, the Office Action states "claim 11 recites the limitation "applying the estimated phase error to the input of a phase locked-loop to create a frequency correction signal;..." and goes on to explain that "the input to the phase locked-loop is the received signal and that the phase error detection is performed inside the phase locked-loop."

b) Response to the rejection

Currently amended claim 11 states, in pertinent part:

> *using the digital signal stream with the cyclic prefix portion removed to generate an average pilot phase error using a discrete Fourier transform (DFT);*
> *applying the average pilot phase error to the input of a phase locked-loop to create a frequency correction signal; and*
> *using the frequency correction signal to modify the sampling time of the ADC.*
> (Emphasis added)

The method of claim 11 has been explained in Applicants' original specification. In this connection, attention is drawn to FIGs. 11A – 11B, and the corresponding description on pages 26-28 of the specification. The "average pilot phase error" is described on page 27, line 5. The phase locked-loop using this average pilot phase error is described using FIG. 11B. Specifically, on page 27, line 27 through page 28, line 3, the specification states: "It is significant to note that the timing recovery system 300 no longer requires band pass filtering and demodulation of the pilot tone. As a direct result, the timing recovery PLL 250 associated with timing recovery

system 300 may consist the loop filter 258 in series between the DFT output signal 415 and the input ADC 230."

Applicants respectfully point out that the Office Action improperly refers to the phase locked-loop of Fig. 7 when asserting that the phase locked-loop is "not capable of receiving a phase error signal." It would be more appropriate to refer to the DFT output signal 415 of FIG. 11A, and also loop filter 258 illustrated in FIG. 11B, wherein loop filter 258 is the timing recovery PLL 250. Applicants respectfully assert that claim 11 is now in condition for allowance.

Because independent claim 11 is allowable, claim 12 that depends directly on claim 11, is also allowable as a matter of law. *In re Fine*, 837 F. 2d 1071 (Fed. Cir. 1988). Consequently, Applicants respectfully request withdrawal of the rejection of claims 11-12, followed by allowance of these claims.

With respect to the rejection of claim 28, currently amended claim 28 states, in pertinent part:

> *means for generating an average pilot phase error using a discrete Fourier transform (DFT); and*
> *means for applying the average pilot phase error to the input of a phase locked-loop to create a frequency correction signal; and*
> *means for using the frequency correction signal to modify the sampling rate of the analog to digital conversion.* (Emphasis added)

The method of claim 28 has been explained in Applicants' original specification using FIGs. 11A – 11B, and the corresponding description on pages 26-28 of the specification. The arguments made above with reference to claim 11, are applicable to claim 28 as well, and will not be repeated here for the sake of brevity.

Applicants respectfully request the withdrawal of the rejection to claim 28, followed by allowance of claim 28.

Claims 19 - 20

a) Statement of the rejection

Claims 19 and 20 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Office Action points out that "the phase locked-loop of Fig. 7 is not capable of receiving a phase *offset* signal." (Emphasis added)

b) Response to the rejection

It must be pointed out that the phase locked-loop circuit of FIG. 7 is merely one embodiment among many that have been used as examples in Applicants' specification. Persons of ordinary skill in the art will recognize that there are many alternative embodiments in implementing a phase locked-loop, which in certain cases, can include additional input signals. Some examples of such input signals include control signals (e.g. enable logic, switching logic etc.), clock signals (e.g. for a digital PLL), and redundant input signals.

In this case, the method of claim19 may be better understood with reference to FIG. 8 rather than FIG. 7. FIG. 8 shows the "received" signal from summer 260, together with a phase offset signal 305, that are both inputs to timing recovery PLL 250. Pages 22-23 of Applicants' specification explain the operation of FIG. 8 in more detail.

Applicants respectfully assert that the rejection of claim 19 under 35 U.S.C. 112, first paragraph, is improper, and request withdrawal of the rejection. Claim 20 depends on allowable claim 19, and is consequently allowable also.

Applicants respectfully request allowance of claims 19 and 20.

Claims 25 - 26

a) Statement of the rejection

Claims 25 and 26 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Office Action points out that "the phase locked-loop of Fig. 7 is not capable of receiving a phase error *estimate*." (Emphasis added)

b) Response to the rejection

As has been pointed out above, a phase locked-loop can receive various input signals. In the case of claims 25 and 26, it would be more pertinent to refer to FIGs. 11A and 11B, rather than FIG. 7. The phase error estimate signal is illustrated in FIG. 11A by DFT output signal 415, which is explained in more detail in Applicants' specification on pages 26 – 27, specifically in lines 4-6 of page 27.

Applicants respectfully assert that the rejection of claims 25-26 under 35 U.S.C. 112, first paragraph, is improper, and request withdrawal of the rejection. Claim 26 depends on allowable claim 25, and is consequently allowable also.

Applicants respectfully request allowance of claims 25 and 26.

Claim 27

a) Statement of the rejection

Claim 27 has been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specifically, with reference to independent claim 27, the Office Action states "claim 27 recites the limitation "means for detecting a phase error between a received pilot tone and a local oscillator signal; means for applying the phase error to the input of a phase locked-loop to generate a frequency correction signal;..." and goes on to explain that "the phase error is detected in the PLL and not applied to the input of the PLL."

b) Response to the rejection

Currently amended claim 27 includes in pertinent part, "means for using the phase error to modify the analog to digital conversion timing." Attention is drawn to FIGs. 6 & 7 and corresponding description, especially on page 21, lines 13-15, that describe this part of claim 27 in such a way as to enable one of ordinary skill in the art to make and/or use it. Applicants respectfully assert that claim 27 is now in condition for allowance.

Applicants respectfully request withdrawal of the rejection of claim 27, followed by allowance of this claim.

D. Rejections Under 35 U.S.C. §102(e)

Claim 14

a) Statement of the rejection

The Office Action states that claim 14 is rejected under 35 U.S.C. §102(e) as being anticipated by Chun et al. (US Patent 6,101,230).

b) Response to the rejection

As is known, a proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of the claim. Accordingly, the single prior art reference must properly disclose, teach or suggest *each element* of the claimed invention. Currently amended claim 14 is shown below for easy reference:

> 14. A digital signal processor configured to compensate for the offset in phase error on a received pilot tone by sending a signal to a phase locked-loop based upon a received signal segment in a discrete multi-tone (DMT) system initialization sequence; *wherein the received signal segment comprises REVERB and SEGUE segments that have*

been generated by a pseudo-random pattern generator using an initial pattern that minimizes the pilot tone phase offsets in both segments.
(Emphasis added)

In allowing claims 1, 2, 7, 8 etc. the Office Action states that these claims are allowable over prior art "because related references do not disclose generating signal segments REVERB and SEGUE using an initial pattern that minimizes pilot tone phase offsets..." Claim 14 includes these segments. The cited prior art, Chun, does not disclose such signal segments. Consequently, at least for this reason, claim 14 is allowable.

Applicants respectfully request withdrawal of the rejection and subsequent allowance of claim 14.

Claim 16-18

a) Statement of the rejection

The Office Action states that claims 16-18 are rejected under 35 U.S.C. §102(e) as being anticipated by Spruyt et al. (US Patent 6,088,386).

b) Response to the rejection

In rejecting claim 16, the Office Action states: "Spruyt et al. discloses a DSP (Fig. 1) configured to detect and zero out a cyclic prefix from a received signal stream at an input of a phase locked-loop when the cyclic prefix is present (column 6, lines 16-26)." While Spruyt discloses a pilot tone input PT of his PLL, together with a second input called an "expected pilot tone input" PT_E, Spruyt does not disclose Applicants' claim 16 that includes "*apply(ing) a signal of substantially zero amplitude to the phase locked-loop when the cyclic prefix is present.*" Consequently, at least for this reason, claim 16 is allowable.

Claim 17 depends on claim 16, and is consequently allowable. Claim 18 has been cancelled without prejudice, waiver, or disclaimer thereby rendering moot the rejection of claim 18.

Applicants respectfully request withdrawal of the rejection and subsequent allowance of claims 16 and 17.

E. Rejections Under 35 U.S.C. §103(a)

a) Statement of the rejection

The Office Action states that claim 15 is rejected under 35 U.S.C. §103(a) as being unpatentable over Chun et al. (U.S. Patent No. 6,101,230), while claims 9 and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Spruyt et al (U.S. Patent No. 6,088,386) in view of Chun et al. (U.S. Patent No. 6,101,230).

b) Response to the rejection

As is known, a proper rejection of a claim under 35 U.S.C. §103(a) requires that the prior art reference (or references when combined) must teach or suggest all the claim limitations. Also, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

Claim 15

As mentioned above, in allowing claims 1, 2, 7, 8 etc. the Office Action states that these claims are allowable over prior art "because related references do not disclose generating signal segments REVERB and SEGUE using an initial pattern that minimizes pilot tone phase offsets..." Claim 14 as well as dependent claim 14, incorporate the above-mentioned segments. The cited prior art, Chun, does not teach or suggest such signal segments. Consequently, at least for this reason, dependent claim 15 is allowable.

Applicants respectfully request withdrawal of the rejection and subsequent allowance of claim 15.

Claims 9 and 10

Claim 9 has been cancelled without prejudice, waiver, or disclaimer thereby rendering moot the rejection of claim 9. Claim 10 depends on claim 31, which in turn depends on allowable claim 7. Consequently, claim 10 that inherits all the limitations of allowable independent claim7, is also allowable.

Applicants respectfully request withdrawal of the rejection and subsequent allowance of claim 10.

Prior Art Made of Record

The prior art made of record has been considered, but is not believed to affect the patentability of the presently pending claims.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims 1-8, 10-17 and 19-31 are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned representative at (770) 933-9500.

Respectfully submitted,

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